Trichoor. A larger specimen, from the more southern part of the Travancore range, was reported in the 'Annals' for December 1862. The original site proves to be a portion of the Anamullay Hills, which Mr. W. T. Blanford describes, in p. 374 of the 'Journal of the Asiatic Society' for 1861, as the highest range in Southern India, lying south-west of Coimbatore and of the Nilgiris, where Mr. King made a collection which he afterwards lost. Mr. Blanford informed me that one of the shells taken was evidently *H. Basileus*. In a short paper by Dr. Pfeiffer, published in the 'Proceedings of the Zoological Society' for 1862, p. 117, a large *Helix*, 68 mill. in diameter (4 mill. less than my original specimen), is described under the name of *H. Titanica*, as taken in the Anamullay forest. It is evidently the same species as *H. Basileus*. Dr. Pfeiffer must have overlooked the description which I forwarded to him in May 1861.

Another *Helix*, 30 mill. in greatest diameter, 25 mill. in the lesser, and axis 17 mill., taken, with smaller varieties, by Lieut. Cox in the same quarter, agrees with *H. læta*, Pfr. (not *H. læta* of Gould), the habitat of which was unknown. From the south part of the Travancore range I have received an imperfect specimen of a *Helix* which is apparently *H. Isabellina*, Pfr., previously known from Ceylon. This is an interesting circumstance in connexion with Dr. Pfeiffer's description, in p. 116 of the 'Proc. Zool. Soc.' for 1862, of a *Cataulus* (*C. recurvatus*) from the Anamullay forest.

In October 1860, I described a small *Cyrena* from Quilon as *C. Quilonica*; and in December 1862, I noted it as a *Batissa*, from a more mature specimen. I have since obtained the shell fully grown from Cochin, and find that it was described in the 'Proc. Zool. Soc.' for 1858, by Mr. Sylvanus Hanley, as *Cyrena* (*Batissa*) *Cochinensis*, which name will be retained on the ground of priority to that of *Quilonica*.—W. H. B.

XLVIII.—*Note on the Habits of some Mexican Reptiles.*

By F. Sumichrast*.

I. Family Varanidæ.

Genus Heloderma, Wagler.

Heloderma horridum, Wagler, Wiegm.

'Escorpion' of the Creoles †. 'Tala-chini' of the Zapotec Indians.

This singular Saurian, the sole American representative of the

* Translated by W. S. Dallas, F.L.S., from the 'Bibliothèque Universelle,' 1864, Arch. des Sci. Phys. et Nat. p. 45.

† The name of *Escorpion* is generally applied in Mexico to all the Saurians whose bite is considered venomous.

family Varanidæ, inhabits exclusively the hot zone which extends from the western slope of the Cordilleras to the shores of the Pacific: it has never been met with, to my knowledge, on the side of the Gulf of Mexico. Its conditions of existence confine it to hot and dry localities, such as the districts of Jamiltepec, Juchitan, and Tehuantepec.

The observation of the habits of the *Heloderma* is the more difficult, as this animal, from the sedentary mode of life imposed upon it by its semi-nocturnal habits, eludes continuous investigation. Moreover the extreme terror which it inspires in the natives has contributed not a little to leave its history in obscurity. The gait of this reptile is exceedingly slow and clumsy, which is explained by the shortness and relative thickness of its limbs, as also by the want of flexibility in the articulations. In very old individuals, or in the females before oviposition, the belly acquires a great lateral development, and drags upon the ground—a deformity which adds still further to the repulsive aspect of this curious creature.

It is usually in holes of greater or less depth, dug at the roots of trees or under a mass of vegetable débris, that the *Heloderma* takes up its abode. Here it remains, during the greater part of the day, rolled up in a state of almost complete immobility. It rarely issues from this state of torpor, except early in the morning, before day, or in the evening, at the times when the terricolous insects are creeping upon the pathways in the woods. As might be expected from the constraint and slowness of its movements, the *Heloderma* can only attack an easy prey. Its food consists essentially of apterous insects, earth-worms, Myriapods, and small species of Batrachia, and sometimes even of putrefying animal matters. It is fond of the eggs of Iguanas; and it is not unusual to meet with it roaming about near the holes dug in the sand, in which these eggs have been left to the action of the rays of the sun.

The *Heloderma* is a *terrestrial* animal in the full acceptation of the term, and its organization is in intimate relation with its mode of life. Its round and heavy tail could not in any way serve it as an instrument of natation, and its short, thick toes could not enable it to climb trees. Hence it is not in the immediate vicinity of rivers or in the depths of the thick forests that this reptile must be sought, but rather in dry spots on the margins of the woods, or in old clearings, the soil of which is covered with vegetable débris, with rotten trunks and grasses. Without having any positive evidence upon this point, I am much inclined to think that this Saurian remains for a longer or shorter time in a sort of *æstival* lethargy, analogous to that which has been observed in the Alligators in some districts of America.

I am led to this supposition (in which, moreover, I am supported by what I have heard from the natives) by the fact that, during the dry season, from November to June, this reptile is very rarely met with, and it is only seen pretty frequently during the rainy season.

The body of the *Heloderma* usually exhales a strong and nauseous odour, the intensity of which increases at the period when the two sexes seek each other for the purpose of copulation. When the animal is irritated, there escapes from its throat a whitish glutinous fluid, secreted by very large salivary glands. If it be struck during this angry movement, it finally throws itself upon its back, which has led the Indians to say, as a precept to be followed under such circumstances, *that the scorpion must always be attacked in front, because it stings behind.* This singular manœuvre, which the *Heloderma* repeats whenever it is menaced, is accompanied by deep breathings and by an abundant secretion of the glutinous saliva already mentioned.

The natives consider the bite of the *Heloderma* to be exceedingly dangerous, and dread it as much as that of the most venomous serpents, such as the *Tepoxo* (*Bothrops atrox*) or the *Mazacoatl* (*Atropos mexicanus* *). In support of this pretended malignity, I have been told of a great number of cases in which ill effects were produced by the bite of the animal, or by eating its flesh in mistake for that of the Iguana. I wished to make some conclusive experiments on this point; but, unfortunately, all the specimens of the *Heloderma* which I could procure during my stay in the countries inhabited by it were so much injured that it was impossible to do so. Without giving the least credit to the statements of the natives, I am not absolutely disinclined to believe that the viscous saliva which flows from the mouth of the animal in moments of excitement may be endowed with such acridity that, when introduced into the system, it might occasion inconveniences, the gravity of which, no doubt, has been exaggerated.

The thickness of the integuments which protect the body of the *Heloderma*, and the hardness of the scaly tubercles with which they are covered, render it almost insensible to the hardest blows; and its instant death is caused only by deep wounds produced by a cutting instrument or a gun-shot. The muscular

* The *Tepoxo*, or *Tepocho*, is tolerably common in most of the subalpine regions of Mexico; the species is subject to a great number of variations. The name *Mazacoatl* signifies *Stag-snake* (from *Mazatl*, stag, and *Coatl*, serpent): it has been given to this species on account of the scales turned up in the form of small horns, which fringe the upper margin of the eyelids. This Ophidian, which is less common than the preceding one, inhabits the warm and temperate as well as the colder regions.

movement persists for a long time after death in this reptile; and if we may believe the relations of the Indians, it is prolonged for forty-eight hours or more in the head after its separation from the body.

The colour of the spots scattered over the body and limbs of *Heloderma horridum* is subject to variations, due to age or to difference of locality. These spots pass from whitish yellow to reddish brown, through a series of intermediate shades; their arrangement, which is far from constant, cannot furnish precise descriptive characters. Age likewise produces great changes in the size: some individuals attain a length of nearly 5 feet.

II. Family Iguanidæ.

Genus Iguana, Laur.

Iguana rhinolopha, Wiegm.

'Iguana verde' of the Creoles. 'Guchachi-guëla'* of the Zapotec Indians.

Genus Cyclura, Harlan.

Cyclura acanthura, Wiegm.

'Iguana negra' of the Creoles. 'Guchachi-chévé'* of the Zapotec Indians.

Although the two species of *Iguanidæ* of which the above is the synonymy belong to different genera, I have thought it best to combine the facts which I have collected upon their history in a single article, in order to give prominence to the principal points in their organization and habits which have induced the separation of the genera *Iguana* and *Cyclura*.

Representatives of these two genera of reptiles are found over a great part of the territory of the Mexican republic—that is to say, in all that zone which stretches along the shores of the two oceans, and is known under the name of the *Tierras calientes*. The true Iguanas are more diffused than the *Cycluræ* upon the eastern side—a circumstance which is easily explained by the fact that this part of the country, being furrowed with water-courses and small lakes (*lagunas*) and covered with a luxuriant vegetation, presents biological conditions the most favourable to the animals, which prefer the vicinity of water. The Pacific coast, on the contrary, is dry and sandy—a condition which suits well with the more terrestrial habits of the *Cycluræ*, and favours their multiplication.

* These native names are literal translations of the Spanish terms *Iguana verde* and *I. negra*. The Zapotec name of the Iguana is *Guchachi*; *guëla* means *green*, and *chévé*, *black*.

The green Iguana (*I. rhinolopha,* Wiegm.) resembles in size, form, and colours the *I. tuberculata* of Brazil: like the latter, it has the sides of the neck sprinkled with conical tubercles, a large scale under the tympanum, and a crest upon the back and the neck; but it is distinguished from that species by the presence of three or four raised scales upon the muzzle. The general colour of the body is a darker or lighter green, with broad, irregular transverse bands of a dark colour; the lower parts are yellowish. In very old individuals, the tail acquires a fine blood-red tint.

The maxillary teeth of the Iguanas are finely serrated on their margins: this structure is connected in these reptiles with an exclusively herbivorous, or, properly speaking, phyllophagous diet. In the stomachs of the individuals which I have prepared I have never found anything but leaves or the remains of soft berries, such as those of the *Goula-beri**. The intestinal sac sometimes attains an extraordinary development, in consequence of the quantity of leaves which are packed into it.

The Black Iguana (*Cyclura acanthura,* Wiegm.) varies much in the number and intensity of the spots or bands with which the ground-colour is marked. The following description, taken from a fresh specimen, may give an exact idea of the typical coloration of this species.

Male.—The general colour is a clear silvery grey, brighter on the upper and lateral parts of the body, where the spots are more distant, and almost disappearing under the numerous confluent dark spots which cover the limbs. The upper part of the head, the throat, and the lower part of the legs are sprinkled with small irregular blackish spots; the rostral scales are entirely of this colour. From the posterior margin of the tympanic aperture a long and large spot, formed by the agglomeration of numerous small ones, covers the shoulder as far as behind the anterior legs. From this spot to the origin of the tail there are six black transverse bands, formed, on the flanks, of confluent spots; these, after separating each into two branches, unite, on the median line of the back, with those of the opposite side. On the upper part of the chest is a large spot of a fine black colour, which occupies nearly the whole space between the fore legs. As has been said, the limbs are so much occupied above by the black spots as to appear of the latter colour, with a few irregular rings formed of light spots. The contrary is the case

* This shrub, which is very abundant in the western parts of Mexico, produces berries, of a saccharine taste and of a viscous consistency, which are employed in the manufacture of indigo (*anil*), for the purpose of accelerating the fermentation of the plant and the precipitation of the colouring matter.

with their lower surface. The tail, of the ground-colour, is traversed by ten or twelve broad and indistinctly limited blackish-brown rings. The raised and compressed scales which form the dorsal crest are alternately grey and black, in accordance with the arrangement of the lateral bands which terminate at them.

The dimensions of the body are very different according to the age of the individuals. That from which the preceding description was taken was an adult, and gave the following measurements:—Total length 30 inches (m. 0·75); from the anus to the chin 18·8 inches (0·27); from the rostral to the first scales of the dorsal crest 2·8 inches (0·07). I should add that these dimensions are those of a *Cyclura* of middle size, and that they very often exceed the numbers above given.

The maxillary teeth of the *Cyclura* are three-lobed at their apex, and the lateral margins are destitute of that fine denticulation which is observed in those of the true Iguanas. By means of this peculiarity they are rendered capable of triturating harder substances; and, in fact, berries with hard kernels, and even insects, are found in the stomach of the *Cyclura*. I have also been assured that, in the vicinity of inhabited places, these reptiles do not disdain to feed upon human excrements.

The *Iguanæ* are more inhabitants of the neighbourhood of water than the *Cycluræ*, as indeed is proved by the simple comparison of the organs of these two genera of Saurians. The tail of the *Cycluræ*, which is rounded and covered with spines, would embarrass rather than assist them in the act of swimming, for which, on the contrary, that of the *Iguanæ*, which is long, slender, and flattened laterally, is admirably adapted. From this difference it results that, whilst the *Iguanæ* invariably dwell near water, the *Cycluræ* can depart far from it, without the conditions of their existence being thereby altered.

In traversing the low forests which extend as far as the eye can see on the vast plains of Western Mexico, glades are met with from time to time in which the bare and cracked soil indicates that these bottoms have been covered with water in the rainy season. A few stunted trees, the feet of which still bear the traces of the mud which has bathed them, form the sole vegetation of these wild spots. It is here that, during the season of Lent, the Indians seek the *Cycluræ*, the flesh of which is regarded by them as a royal dish. Arrived at the open glade, they carefully examine all the holes and clefts of the trunks; and it is rarely that their piercing sight fails speedily to discover some of the poor animals, the objects of their avidity, buried in these cavities. The great difficulty, however, consists in getting the animal to issue from its prison, in which it is literally incrusted. When the trunk is not too thick, a few

blows of a *machete* (a kind of sword) suffice to do the business; in the opposite case, the Indian, with the patience characteristic of his race, will endeavour to gain possession of the unwilling animal by drawing it out gradually by the end of its tail. When once seized by the neck, the unfortunate *Cyclura* undergoes an operation which must deprive it of all power of resistance or hope of flight. With the point of a knife, the hunter cuts the skin of its cheeks along the upper jaw, and passes through this aperture the slender and flexible twig of a liana, which he then unites firmly beneath the chin, so as to prevent any movement of the lower jaw. This done, he half pulls off the last joint of the toes on both the fore feet, attaches one to the other by means of the tendon which is thus laid bare, and passes them behind the head. The same operation is repeated with the hind feet, which are also crossed upon the back. Thus garotted, the animal is unable to bite, scratch, or make its escape.

The *Iguanæ* are also hunted either by the assistance of dogs trained to their pursuit, or by placing at the entrance of the holes into which they retire running loops attached to the flexible branch of a tree, which seize the animal by its neck as it issues from its burrow.

In the western part of the isthmus of Tehuantepec, where I collected most of the facts detailed in these notes, only the eggs of the green Iguana are sought as food; the hunters, therefore, never capture the males of this species, to which they give the name of *Garobos*. The flesh of the *Cyclura*, on the contrary, is regarded as an excellent dish, and its eggs are much prized by the native *gourmands*. These eggs are nearly of the same size and form as those of the *I. rhinolopha*; their greatest diameter is about an inch and a quarter, and their smaller diameter four-fifths of an inch. In several females of the *Cyclura* which I dissected between the 15th and 20th of March, I found from thirty-two to thirty-four eggs, completely developed and placed end to end in the double oviduct which descends from the ovary to the cloaca. The ovary contained, besides, a nearly equal number of other eggs in a less advanced state; some of these were of an orange-yellow colour and of a flattened ellipsoidal form, presenting a lenticular inflation at the centre; others were spherical, larger, and transparent, like those of frogs.

During a voyage upon the river Goazacoalcos, I witnessed a singular operation performed upon a female Iguana. One of the Indians who had the management of the canoe, having succeeded in capturing this reptile, opened its belly, carefully removed the eggs, and having sewn up the wound, let the animal go, "in the hope," as he said, "of finding it again some day." At the middle of March the green Iguanas begin depositing their eggs,

in large holes dug in the sand. A single excavation sometimes contains as many as ten dozen of these eggs, deposited in it by several females. The same thing is observed in the *Cycluræ*, with this difference, that the number of eggs thus deposited in a common hatching-place does not exceed six or seven dozen.

When taken young, the Iguana is easily tamed, and becomes perfectly familiar with the person who takes care of it; the adults, on the contrary, never lose in captivity their natural wildness. These animals endure a long abstinence without any sensible diminution in weight; in many places, the natives, taking advantage of this peculiarity, keep the Iguanas as provision for Lent for more than a month, after having sewn up the mouth and attached the feet.

The green Iguana does not seem to dread the vicinity of the alligators (*A. lucius*, Cuvier) which usually abound on the shores which it prefers for its habitation. The black Iguana, on the contrary, appears to have much fear of them. In one of my expeditions on the Rio Chicapa, I took one alive, and attached it to the prow of the canoe; the animal, having succeeded in freeing itself from its bonds, immediately threw itself into the water, in order to gain the shore; but, at the moment of its arrival, perceiving an alligator stretched in the sun on a small sandy beach, it returned towards the boat with signs of the most lively fear. On this same occasion I had most striking ocular proof of the tenacity of life and the muscular power of the Iguanas. Several of those which I shot, although literally riddled with large shot, still retained sufficient strength to run to the river and plunge into it, after having tumbled down from the tops of the trees on which they were stretched in the sun, a height of twenty or thirty feet.

Genus Basiliscus, Latreille.

Basiliscus vittatus, Wiegm.

'Pasarios' of the Mexicans. 'Zumbichi' of the Zapotecs.

This charming animal, which does not in any way resemble in its habits the fabulous creature to which the ancients gave the name of *Basilisk*, is common on the margins of nearly all the rivers of the warm and temperate regions of Mexico. It is in the spring, in the breeding-season, that its observation is most easy; and it is then also that the male especially attracts attention, on account of the elegance of his form, the vivacity of his colours, and the grace of his movements. As soon as the sun has warmed the air, he quits his nocturnal retreat, and commences the pursuit of his prey. If the dry trunk of a tree rises from the margin of the water, we may be almost certain of

finding upon it, during the hot hours of the day, a Basilisk acting the part of a sentinel. With his body voluptuously extended, as if to absorb as much as possible of the solar heat, he remains in a state of perfect quietness; but if some noise attracts his attention, he raises his head, inflates his throat, and rapidly agitates the membranous crest with which his occiput is crowned. His piercing eye, with its dull-yellow iris spangled with gold, glances inquisitively on every side; if the danger be imminent, his body, previously flaccid and soft, draws together like a spring, and, leaping with the rapidity of lightning, he throws himself into the water. In swimming, he raises the head and breast; his fore feet strike the water as oars, whilst his long tail furrows it like a rudder. From this habit the animal has received its name of *Pasarios* (*passe-ruisseaux*), which is also applied, although erroneously, to a species of an allied genus, *Corythophanes chamæleopsis*.

At the end of April or the beginning of May, the female deposits from twelve to eighteen eggs in a hole at the base of a stump or trunk of a tree, where she leaves them to be hatched by the heat of the sun. These eggs, which in form and colour are identical with those of the Iguanas, measure four-fifths of an inch in their long diameter, and about half an inch in their shorter. The young reptiles which issue from them in the course of a few days are very different from the adults in their colours.

The food of the Basilisk consists essentially of insects, which it captures with much dexterity when they settle upon the low branches overhanging the brooks, near the spot where it is on the watch.

Age and sex induce some modifications in the colour of different individuals. The occipital membrane and the tail, which in the females and young are of an olive-yellow colour, are tinted with a fine blood-red in the old males.

Genus Corythophanes, Boié.

Corythophanes chamæleopsis, Dum.

Chamæleopsis Hernandezii, Gray.
Chamæleo mexicanus, Hernandez.

If the kind of osseous casque which characterizes this reptile were not of a very different nature from that which adorns the head of the Basilisk, one would be tempted, at the first glance, to refer the *Corythophanes* to the same genus as the latter, so much do they resemble each other in the form of the body. But in the Basilisk the occipital prominence only consists of a membranous hood, supported internally by a greatly developed

sagittal crest, which becomes cartilaginous at its extremity; whilst in *Corythophanes* it is formed entirely by an abnormal expansion of the bones of the cranium. The facies of the species under consideration also presents some features of resemblance to that of the African Chameleon, which led Hernandez to give it the name of *Chamæleo mexicanus*.

The colours of the *Corythophanes* do not present those brilliant green, yellow, or reddish tints which are observable in the coat of the Basilisk, but a mixture of brown, fulvous, black, and white, which, however, is not unpleasing. I have observed that these tints are not indifferent to the action of light: one of these reptiles, which I kept alive for more than a month, presented this peculiarity:—its throat, which was white during the day, acquired a darker tint at night, as did also all the lighter regions of the body. Although very lively by nature, this little animal allowed itself to be taken and caressed. If I passed my hand several times over the flank, it lay down immediately as if magnetized by this touching. If I repeated the same manœuvre upon the belly, it crossed its fore feet in the attitude of prayer, and fell into a state of perfect immobility. It became so tame that it would run towards me to take from my hand the flies and other insects of which it was fond.

The *Corythophanes* is not a shore animal, like the Iguanas and the Basilisks. It lives scarcely anywhere but in the woods among the rocks, and delights especially in the oak-forests, where the sombre coloration of its body, which harmonizes with that of the dry leaves, enables it to make successful ambuscades for the capture of the insects which constitute its prey. It is exceedingly active, and, when it can take to flight, its capture, except by shooting it, becomes very difficult. In running, it raises the front of the body almost vertically, at the same time lashing the ground with its tail, by which its appearance at such times is rendered very singular.

The credulity of the Indians has not failed to ascribe extraordinary qualities to this little creature, which is at once so pretty and so odd. At the same time that they greatly dread the inoffensive pricking of the spines which are observed on the sides of its head, they extol the virtues of its body, when dried and carried as an amulet, against the evil eye (*el aire*) and that multitude of supernatural ills which are born of their sombre and superstitious imaginations.

The *Corythophanes* are nowhere common; but the species which forms the subject of this note inhabits both slopes of the Cordillera at very distant points. Thus I have met with it near the Haciendas of the Mirador and the Potrero (in the department of Vera Cruz), in the grottoes of the Cerro de Santo Do-

mingo (isthmus of Tehuantepec), and in the forests of Gineta (department of Chiapas). All the specimens which I procured in these different localities were absolutely identical.

Genus Phrynosoma, Wagler.

Phrynosoma orbiculare, Wiegm.

'Caméléon' of the Mexicans.

This little Saurian, which is equally curious both in its appearance and habits, owes to this circumstance its having been known to the first observers who traversed Mexico, and also its having been shifted, in the different herpetological classifications, from one family to another, until at last it has come to take up its natural position in the neighbourhood of *Tropidolepis*.

The *Phrynosoma*, which is peculiar to the cold and dry regions of the Mexican plateau, inhabits sandy spots exposed to the sun, such as the margins of roads and the arid ridges, where the earthy colour of its body easily conceals it from observation. Ill formed for running, it has none of that lizard-like vivacity which has become proverbial; its gait is slow and awkward. On seeing it making its way painfully over the sand, we at once perceive that the poor devil must have no little trouble in procuring its daily bread. Its thick tongue, fastened to the palate, cannot be darted, like the Chameleon's, at the insects which pass within its reach; its large and dragging belly prevents it from seizing a prey by running in the manner of the slender lizards, or capturing a fly on the wing like the impetuous *Anolides*. In order that it may dine, one of the heavy beetles of the sands, as ill organized as itself for locomotion, must, so to speak, come to tickle the teeth of this melancholy hunter. This forced abstinence of the *Phrynosoma* has obtained for it, among the natives, the reputation of living upon air.

Destitute of means of defence, it allows itself to be taken without even attempting to bite the hand that has seized it. I have several times kept one of these inoffensive animals alive: they usually remained squatting in a corner of my room; and whenever they disappeared, I was certain soon to find them again in my shoes or in the pockets of my clothes.

On several occasions when I have put females of *Phrynosoma orbiculare* into alcohol, I have seen the young immediately issue from the cloaca, to the number of ten or twelve. I have made the same observation with regard to a species of an allied genus, *Tropidolepis formosa*; and I have reason to believe that most of the Mexican species of *Tropidolepis*, or at least those of the colder regions, are likewise ovo-viviparous.